

14/12/16

APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER



6251A_D16_1

(Pages: 2)

Name:

Reg. No:

FIRST SEMESTER M.TECH. DEGREE EXAMINATION DECEMBER 2016

Branch: Electrical & Electronics Engineering

Specialization: Power Electronics

08EE6251(A) POWER SEMICONDUCTOR DEVICES AND MODELING

Time: 3 hours

Max. marks: 60

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q.no.	Module 1	Marks
-------	----------	-------

1.a	(i) Explain different losses in a power semiconductor switch? How switching frequency is associated with power losses?	3
-----	--	---

Answer b or c

b	(i) What is safe operating area? What is its significance?	6
---	--	---

	(ii) How Electromagnetic interference occurs due to high frequency switching?	
--	---	--

c	(i) What are the advantages of using high frequency in converters?	6
---	--	---

	(ii) Explain the significance and applications of static and dynamic characteristics.	
--	---	--

Q.no.	Module 2	Marks
-------	----------	-------

2.a	Explain the static and dynamic characteristics of a power diode.	3
-----	--	---

Answer b or c

b	(i) With neat diagram explain the construction of Bipolar junction Transistor?	6
---	--	---

	(ii) How secondary breakdown happens in a Bipolar junction Transistor?	
--	--	--

c	Explain the Turn ON and Turn OFF characteristics of a Bipolar junction Transistor.	6
---	--	---

Q.no.	Module 3	Marks
-------	----------	-------

3.a	Compare BJT and Thyristor.	3
-----	----------------------------	---

Answer b or c

- b (i) Explain two transistor analogy of Thyristor? **6**
(ii) With neat diagram explain the gate and switching characteristics of SCR?
c Explain the series –parallel operation of SCR? **6**

Q.no. Module 4 Marks

- 4.a What is voltage control device? What is the principal difference between IGBT and MOSFET? **3**

Answer b or c

- b (i) Compare Thyristor and GTO. **6**
(ii) Explain the turn ON process of a MOSFET with neat diagram and characteristics?
c With neat diagram explain the construction and working of IGBT? **6**

Q.no. Module 5 Marks

- 5.a Why isolation is required in the firing circuit? **4**

Answer b or c

- b What is the need of snubber circuits? Explain the basic snubber circuits? **8**
c (i) Explain the base drive circuit for SCR and MOSFET. **8**
(ii) Explain the working of pulse transformer and optocoupler.

Q.no. Module 6 Marks

- 6.a Explain the need of heat sink? What are the different methods of heat transfer? **4**

Answer b or c

- b Explain the heat transfer in a power switch? Obtain the electrical analogy of thermal components. **8**
c (i) Explain the process of selection of heat sink. **8**
(ii) Explain different types of heat sink.